Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/768
ARGENTINA
February 1964
Submitted in:
SPANISH and FRENCH

Confidential until official release during Conference

Abstract

APPLICATION OF HEAP-LEACHING TO THE PROCESSING OF ARGENTINE ORES

Pedro N. Stipanicic, Rafael C. Coppa and
Aldo M. Cecchetto

The great area of Argentina and the scattered distribution thereon of numerous uranium ore bodies possessing special characteristics has made it necessary to study the possibility of applying heap-leaching as an economic method of ore-processing.

The need to attempt processing with unconventional methods arises from the presence of various unfavourable factors, such as:

(a) the existence of deposits of reasonable size but low grade, whose ores do not justify the cost of transport to distant processing centres and whose low uranium content makes the installation of a conventional processing plant an uneconomic proposition;

(b) the existence of many uranium ore bodies of medium, normal or even high grade, but so small in size that it would not be worth while setting up conventional concentrating plants, added to the considerable freight costs resulting from the distance to be covered to reach them;

(c) the existence of deposits from which normal grade ores can be obtained by selective working methods which, however, leave behind appreciable quantities of uranium of marginal or low grade, so that the deposits are not fully exploited.

The paper briefly reports the results of heap-leaching trials carried out with various Argentine uranium and copper-uranium ores, on both laboratory and semi-pilot-plant scale, more particular attention being devoted to the results for one typical ore, that from the "Don Otto" deposit (Salta Province).

The study for this special case includes:

1. general considerations regarding the method;
2. laboratory tests using 1-metre columns;
3. intermediate-stage tests using 4-metre columns;
4. results of treating an experimental heap of 700 tons of ore;
5. description of a production plant for the treatment of 36 000 tons of ore.

The method adopted can be summarized as follows:

The coarsely-milled ore is placed on a water-proofed platform tilted slightly towards one corner. The parallelepipedal heap of ore, with vertical sides maintained in place by a suitable surround, has a horizontal top surface. The leaching solution is poured over the surface of the heap and the percolation rate is controlled by a layer of clay of variable thickness on top of the ore. The solution circulates through the mass and collects at the level of the platform, where a pebble bed facilitates normal drainage, thence passing into a collecting tank. Here the pH of the solution - which has been partially neutralized during its passage through the ore - is adjusted and the solution is then re-cycled to the top of the heap. This cycle (percolation - pH adjustment - re-cycling - percolation) is repeated until the maximum quantity of uranium has been leached out of the ore, after which the rich solutions are removed by washing with acid water. The uranium-bearing liquids are then recovered by precipitation with milk of lime and, after drying, the lime preconcentrate is sent to a plant for final purification.